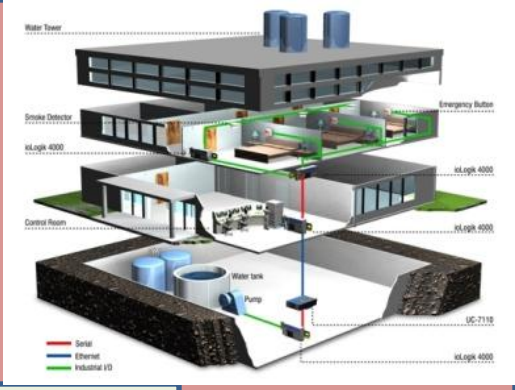
Helwan University
Faculty of Engineering – Mataria



A Course on

Conservation

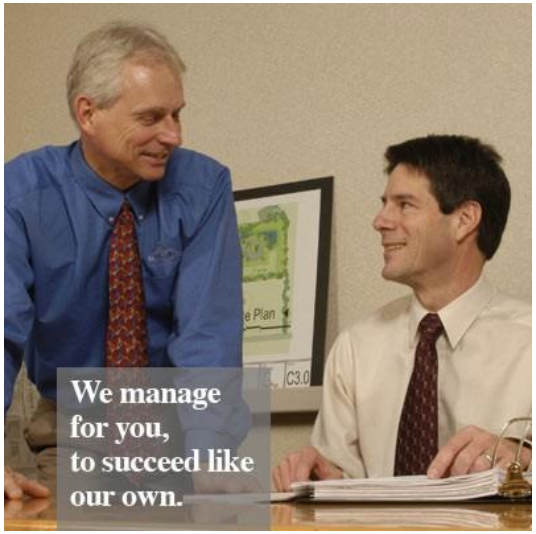
Energy Management Systems

Ass.Prof Adel Hussien

2012

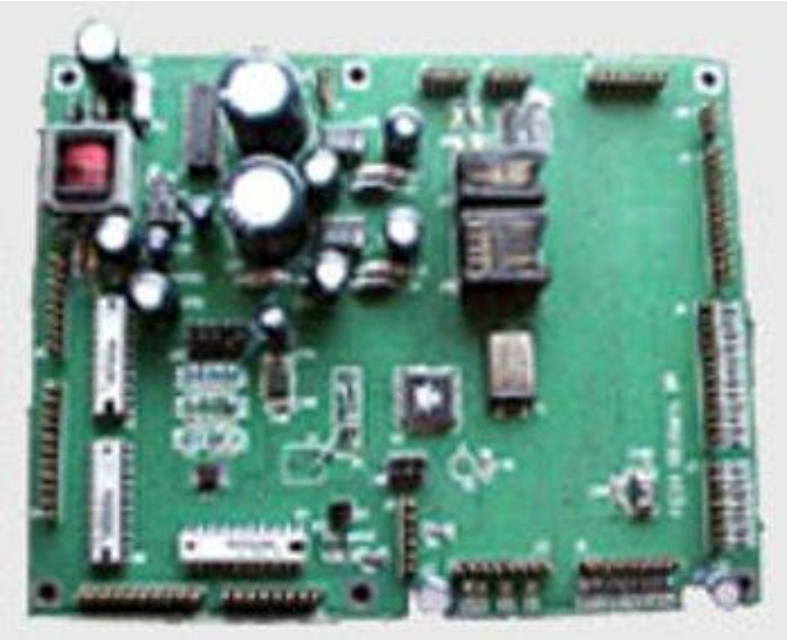
INTRODUCTION

Control or manage the use of energy.



INTRODUCTION

Microprocessor



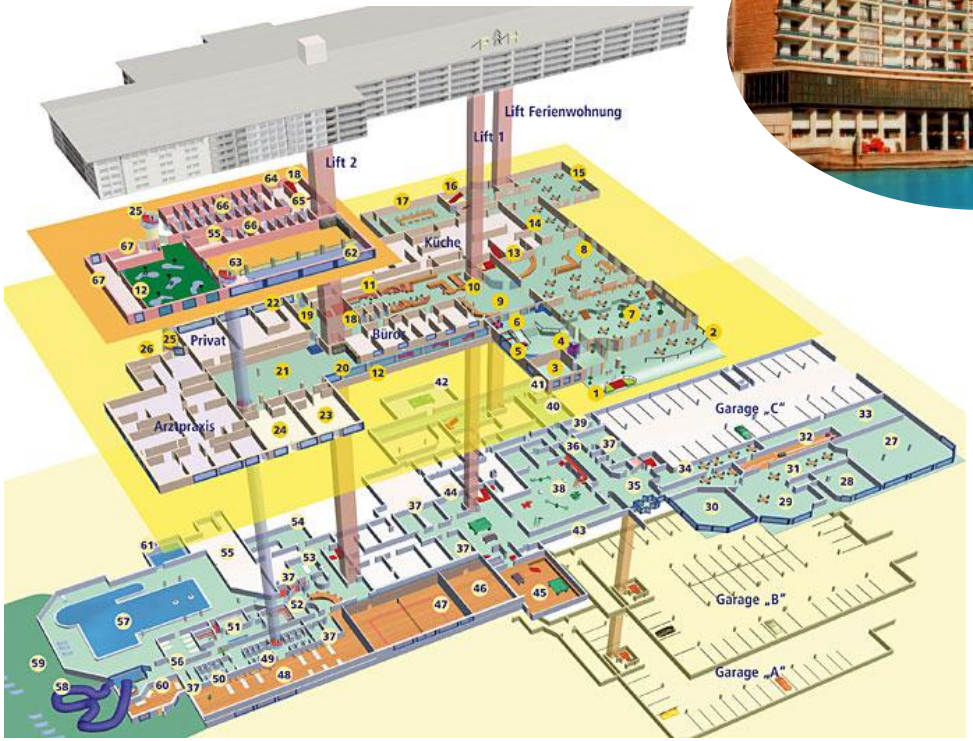
Monitoring function

INTRODUCTION

Feasibility studies is of important for providing building owners, operators and engineers with:

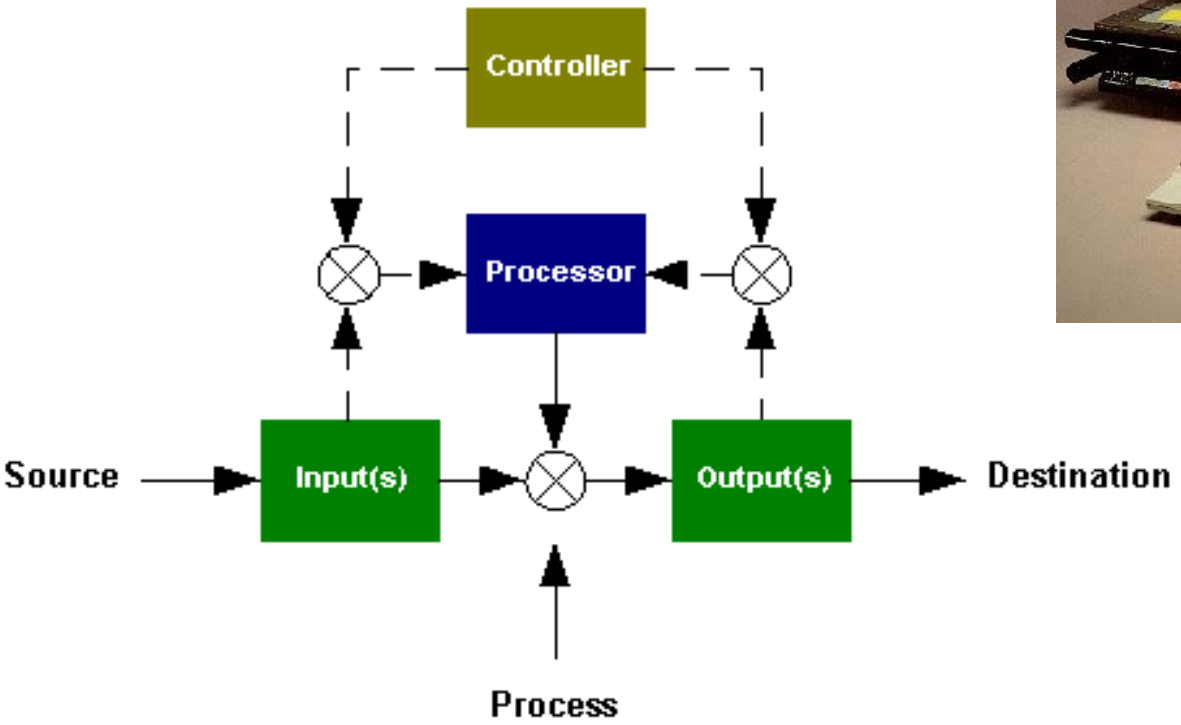
INTRODUCTION

1- Areas where EMS can be applied.



INTRODUCTION

2- Control strategy.

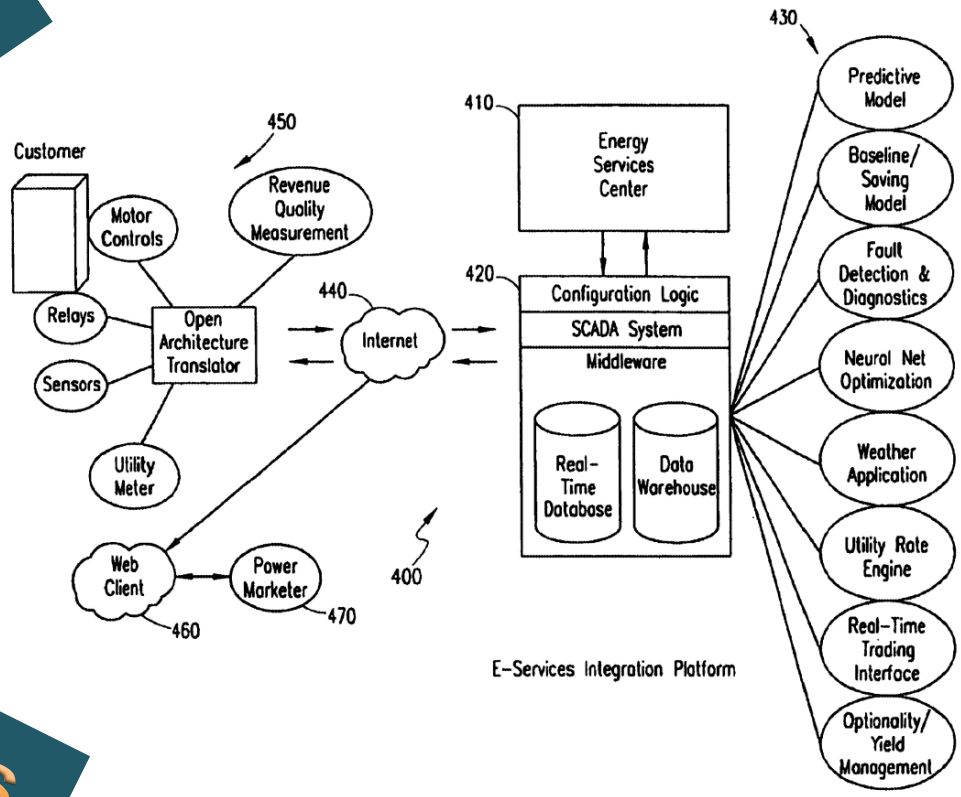


INTRODUCTION

3- Quantification of savings.

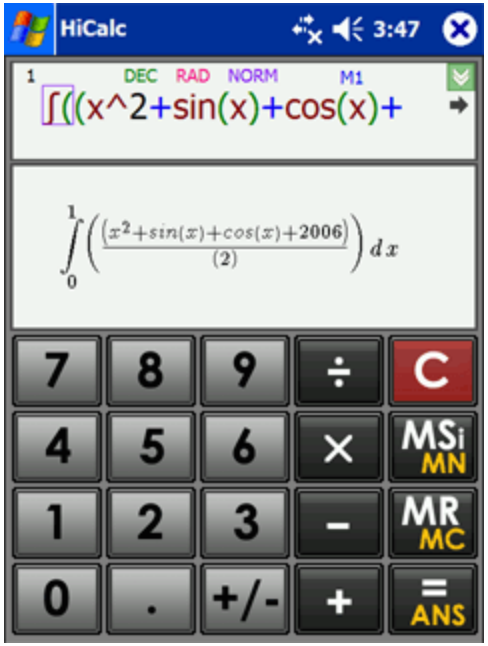
Energy savings.

Money savings.



INTRODUCTION

4- Determination of EMS features and functions.



INTRODUCTION

5- Specifications for bidding.

BILL OF QUANTITY

E2000/81 S G D Construction Limited

Ikea Distribution centre phase 2: Doncaster

CAR PARK Car Park Areas

Item	Description	Quantity	Unit	Rate	Extension
1	Provide lay and roll mm average consolidated thickness of 40mm nominal size dense base (roadbase), followed by mm average consolidated thickness of 20mm nominal size dense binder course and then mm average consolidated thickness of 14mm nominal size density	946.00	M2	£42.34	£40,053.64
2	Provide lay and roll mm average consolidated thickness of 28mm nominal size dense base (roadbase) macadam, followed by mm average consolidated thickness of 20mm nominal size dense binder course macadam, all to BS. 4987.	355.00	M2	£22.72	£8,065.60
3	Provide, lay and roll mm average consolidated thickness of 28mm nominal size dense base (roadbase) macadam, followed by mm average consolidated thickness of 20mm nominal size dense binder course macadam, and then mm average consolidated thickness of 10mm	478.00	M2	£21.19	£10,128.82
4		731.00		£21.46	£15,687.26
Total for Section :	CAR PARK				£73,935.32
Total for Estimate :	E2000/81				£73,935.3

INTRODUCTION

6- Proper EMS operation and maintenance.

APPLICATIONS

- Commercial buildings
- Industrial plan
- Institutional building
- Operation of boilers and chillers (plants)
- Hot water generators (buildings)
- Control peak electric demand.
- Etc.

EMS FUNCTIONS

EMS FUNCTIONS

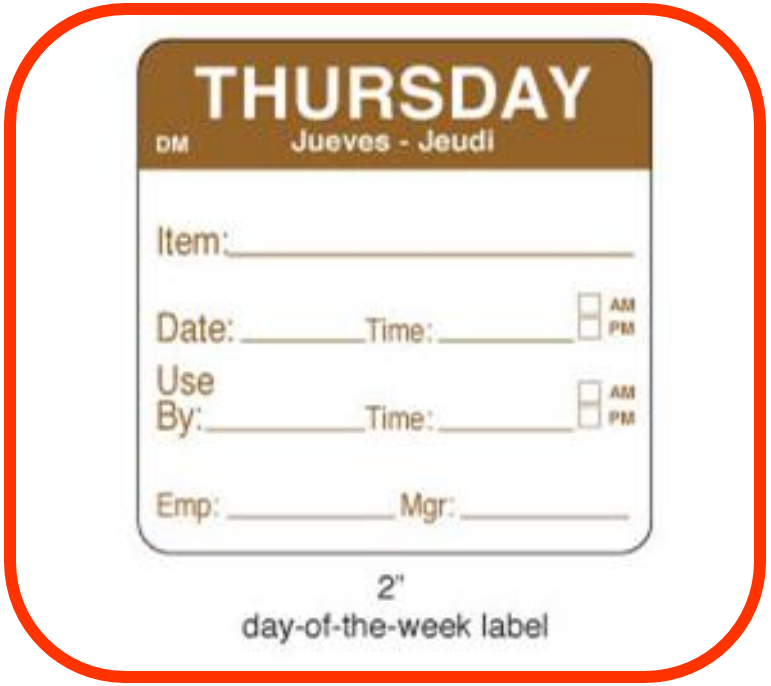
1- Fixed Interval ON/Off Control.

Time-of-day control

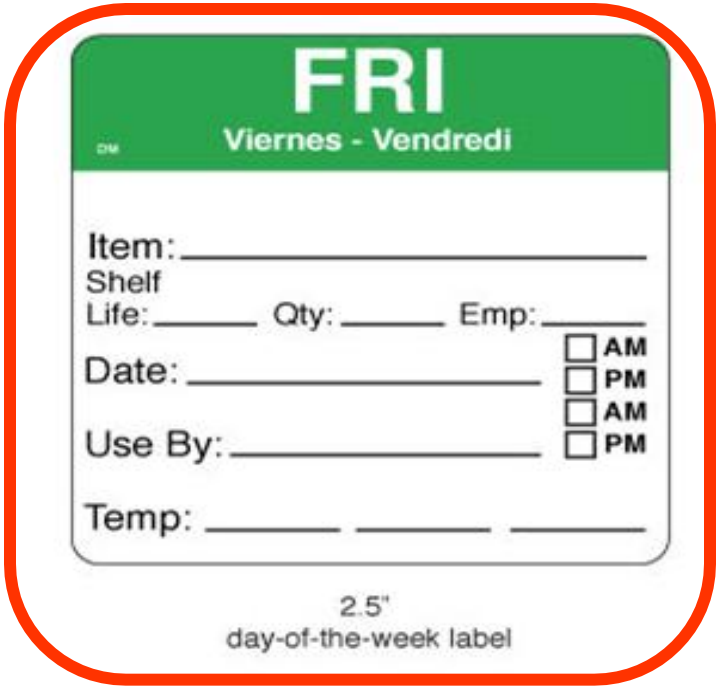
EMS FUNCTIONS

1- Fixed Interval ON/Off Control.

Time-of-day/day-of–week control



2"
day-of-the-week label

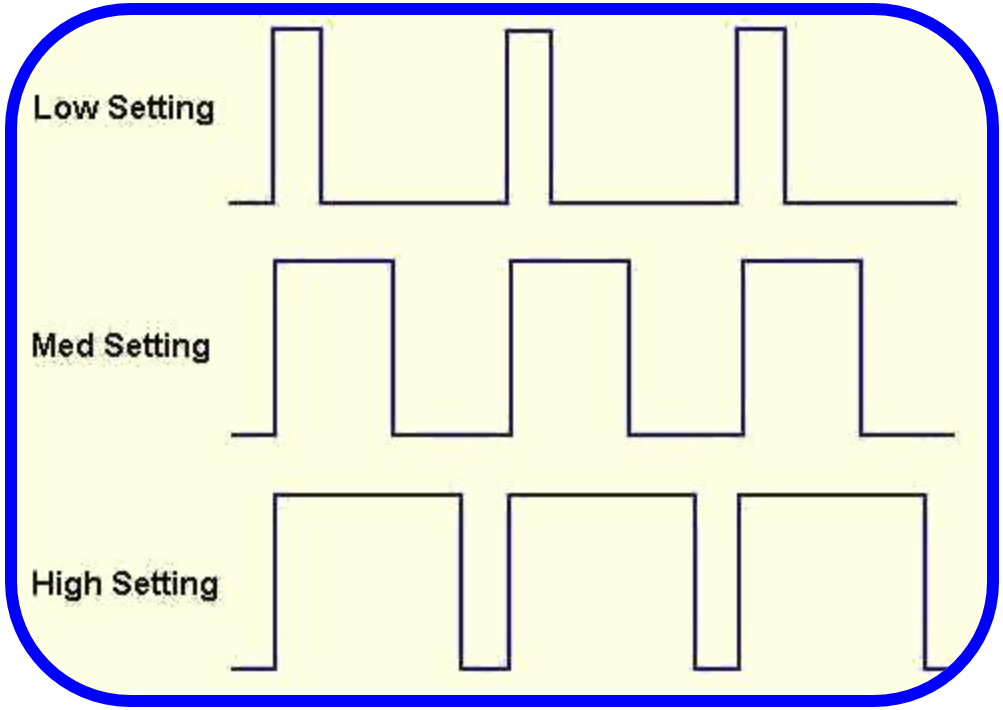


2.5"
day-of-the-week label

EMS FUNCTIONS

1- Fixed Interval ON/Off Control.

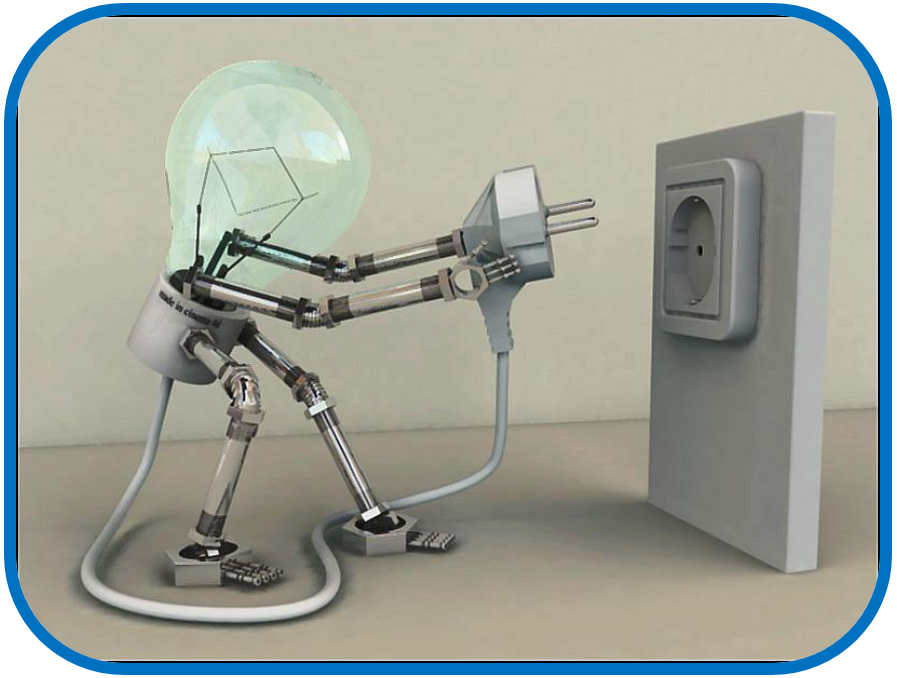
Duty cycling



EMS FUNCTIONS

2- On/Off Control with Outside Variable Dependence.

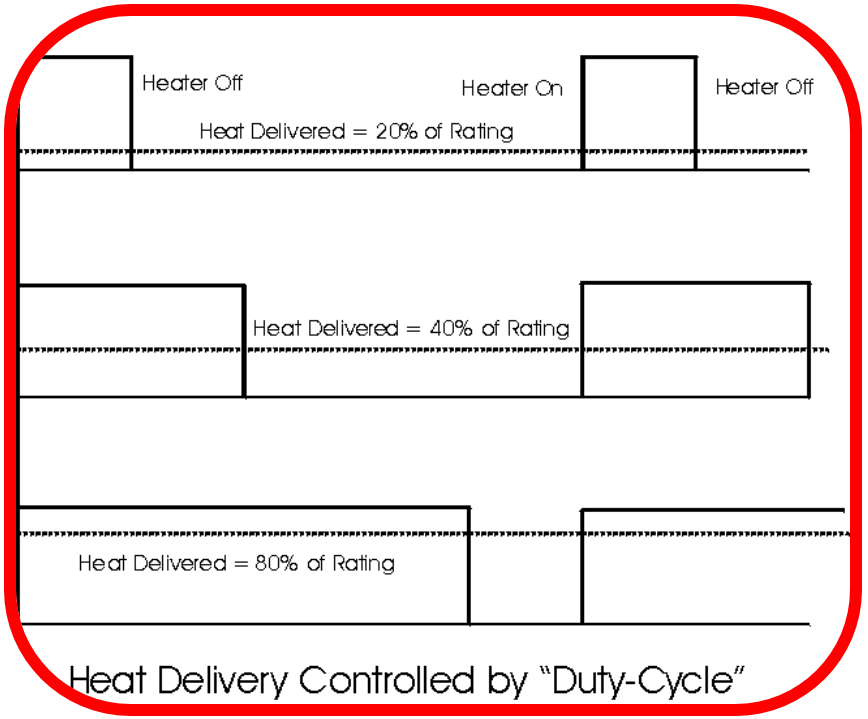
Optimum on/off control



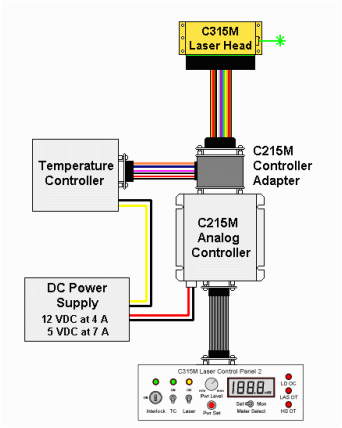
EMS FUNCTIONS

2- On/Off Control with Outside Variable Dependence.

Duty-cycling with temperature reset



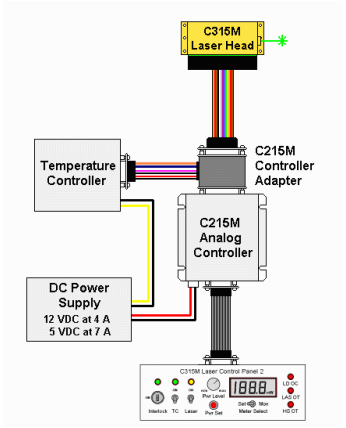
EMS FUNCTIONS



3- Other Temperature-Based Control Schemes.

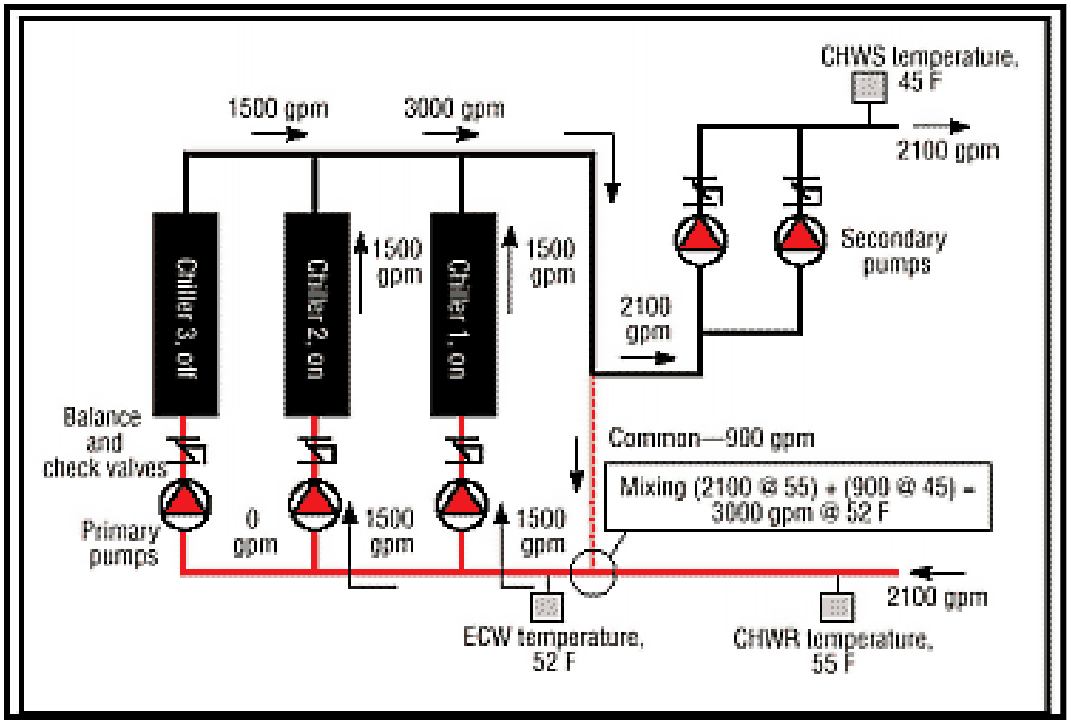
Night set-back/set-forward control

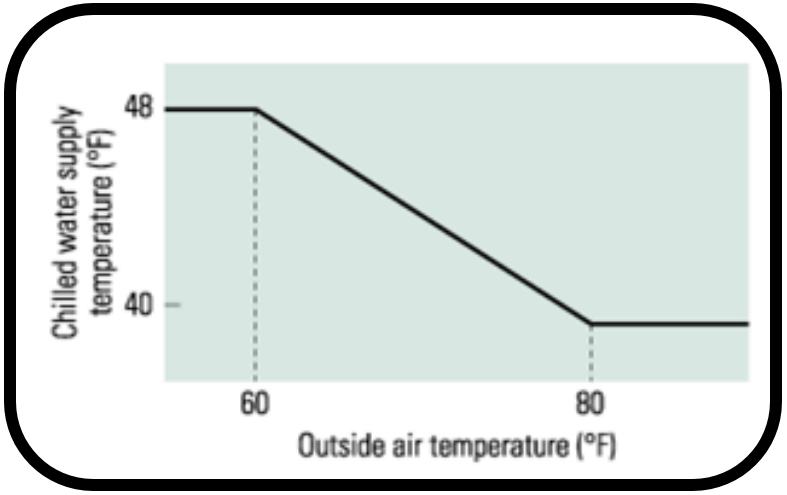
EMS FUNCTIONS



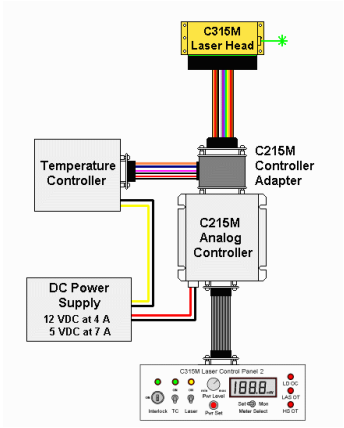
3- Other Temperature-Based Control Schemes.

Reset of chilled water temperature



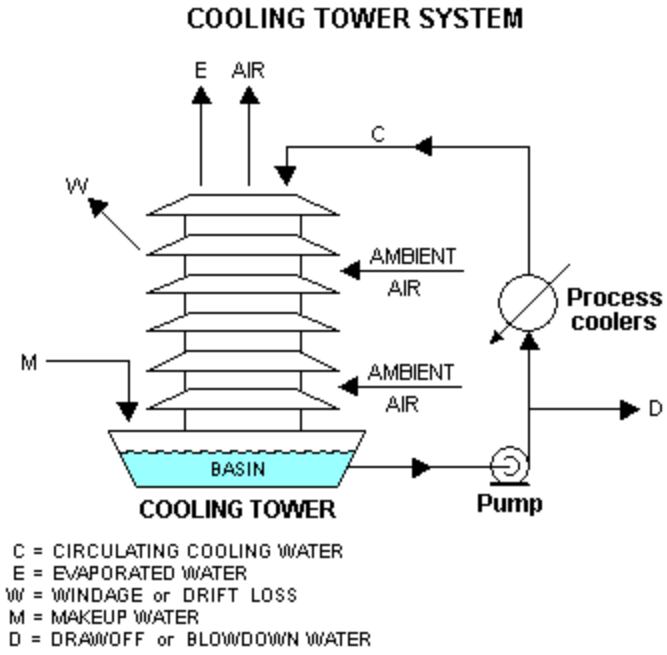


EMS FUNCTIONS

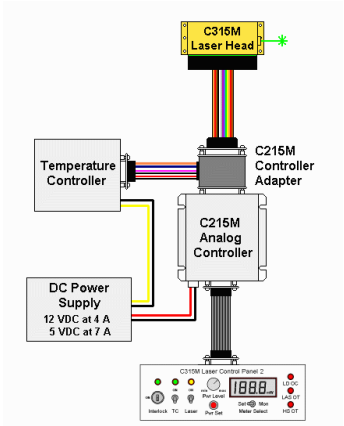


3- Other Temperature-Based Control Schemes.

Control of cooling tower

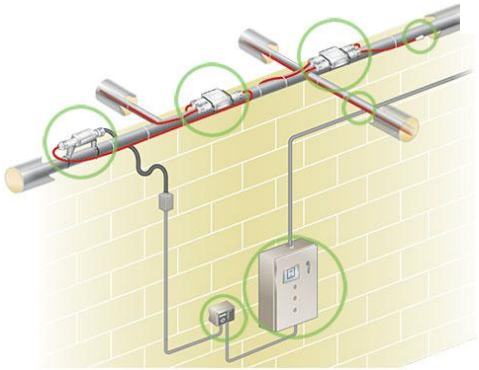


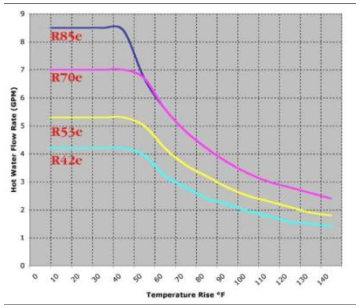
EMS FUNCTIONS

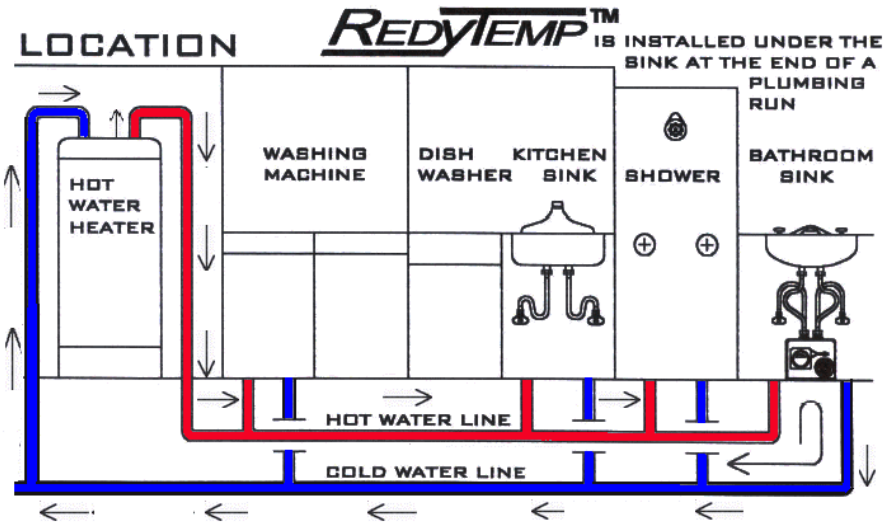


3- Other Temperature-Based Control Schemes.

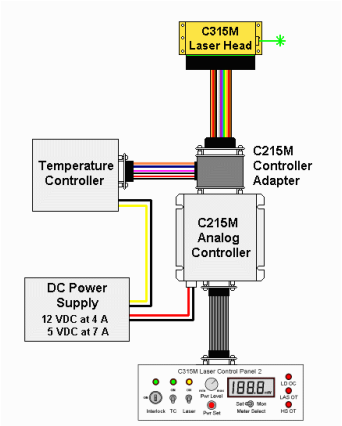
Reset of hot water temperatures





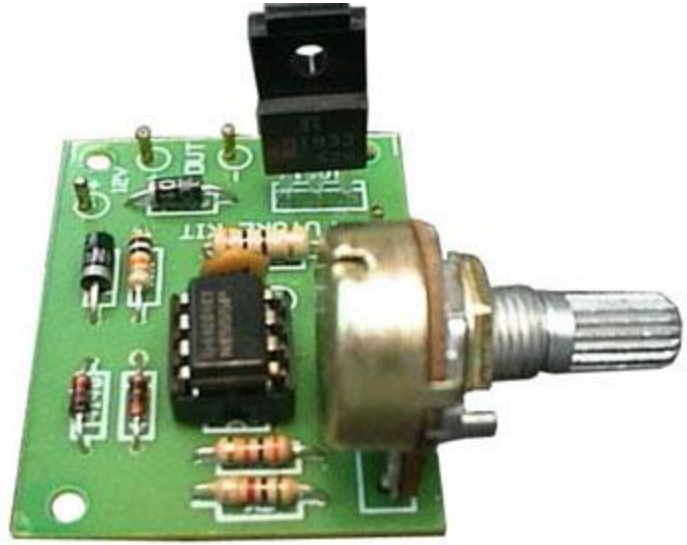


EMS FUNCTIONS



3- Other Temperature-Based Control Schemes.

Control of motor speeds



EMS FUNCTIONS

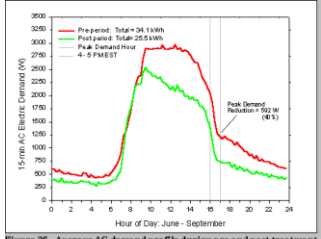
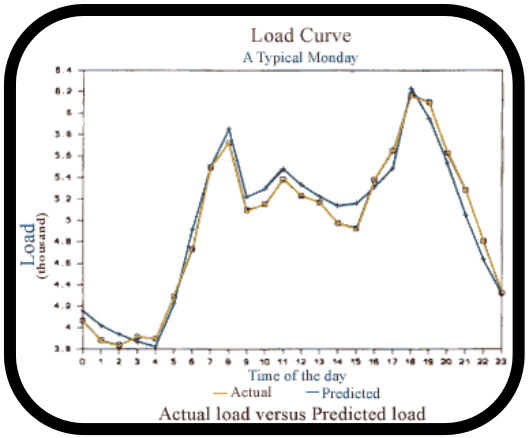
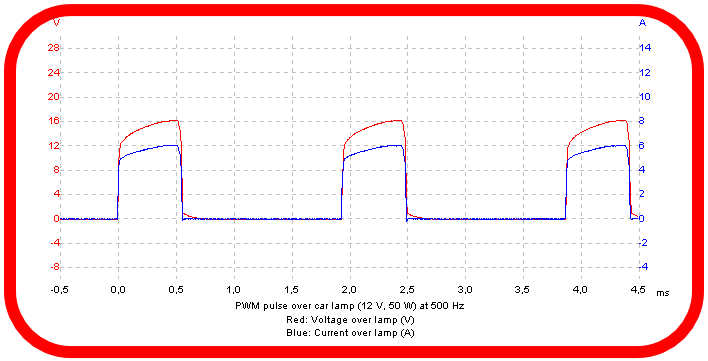


Figure 36. Average AC demand profile during pre and post treatment periods for all seven shops.

4- Control of Peak Electric Demand





EMS FUNCTIONS

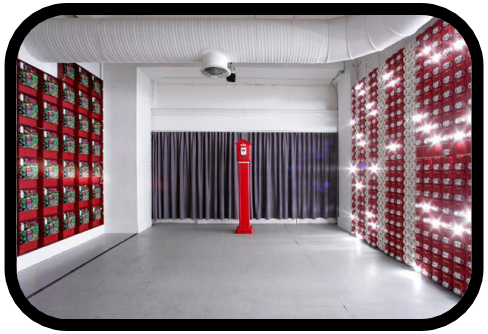
5- Monitoring and Reporting Functions

Energy consumption and demand

EMS FUNCTIONS

5- Monitoring and Reporting Functions

Malfunctions and alarms



EMS FUNCTIONS

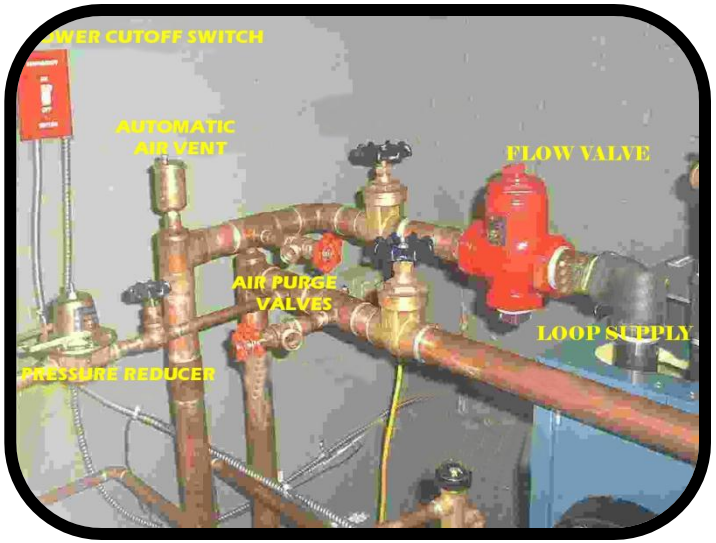
5- Monitoring and Reporting Functions

Fire and Security functions

EMS FUNCTIONS

5- Monitoring and Reporting Functions

Preventive maintenance functions



OPTIMIZATION CONTROL SYSTEMS

1- Chiller Optimization

1- Chiller soft start

2- Variable start-up loading

3- Lead-lag control

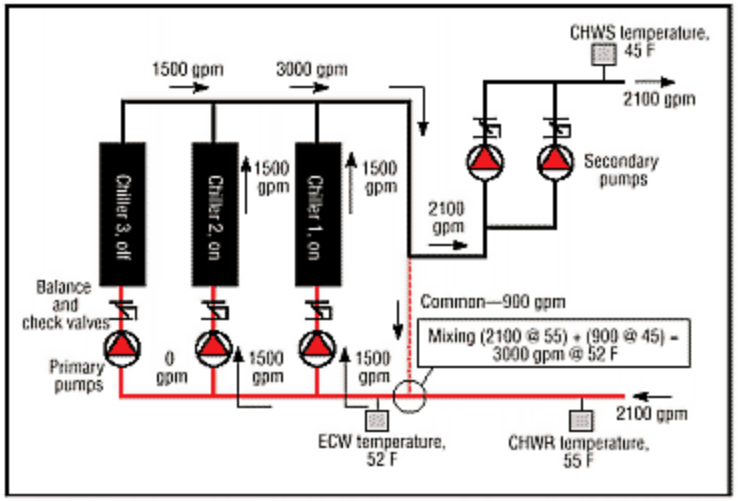


Fig. 6 Production flow greater than distribution flow.

OPTIMIZATION CONTROL SYSTEMS

2- Boiler Optimization

1- Combustion efficiency optemization

2- Boiler loading

3- Lead-lag sequence

DDC OVER PNEUMATIC CONTROLS

1- More precise errors are minimized.

2- Preventive maintenance functions

3- Retain calibration more accurately.

PROCEDURE

1- Energy consumption
2- Areas where EMS can be applied
3- Priority
4- Determination of control strategy
5- Quantification of energy savings
6- List of components and features
7- Specifications
8- Cost
9- Pay back

Thank you

Any questions

Preventive	وقائى
shed	سقف
Cure	معالجة